

REMARKS

Claims 1-57 were originally pending in the application. Claims 1-34 and 57 are rejected. Claim 21 has been cancelled. Claims 1-3, 6, 11, 15, 17, 20, 22, 28, 29, 45, 46, and 57 are hereby amended. Claims 1-20 and 22-57 are now pending in the application. Favorable reconsideration and allowance of this application is respectfully requested in light of the following remarks.

I. Claim Objections

Claims 1, 45, and 57 have been objected to because the phrase “fabricating a MEMS device onto a substrate” is said to be unclear. These claims have been amended to instead recite “fabricating a MEMS device on a substrate” as suggested in the Office Action/

Claim 15 has been objected to because the phrase “depositing the first layer is deposited” is unclear. Claim 15 has been amended to instead recite “depositing the first layer” as suggested in the Office Action.

Withdrawal of the Claim Objections is therefore respectfully requested.

II. Claim Rejections Under 35 U.S.C. §112

Claims 2-27 were rejected under 35 USC. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 2, it was said to be unclear if the recess is formed into the first layer, where the spacer member is located, which layers constitute the spacer member, or if the spacer member is formed by deposition, removal, or both. Claim 2 has been amended to clarify that the wafer includes a first layer and a second layer disposed outwardly from the first layer. The second layer has an outer surface that provides the first surface of the wafer. Accordingly, claim 2 clearly identifies that the spacer member is formed by forming a recess into the second layer.

Regarding claim 3, it was said to be unclear if the recess is formed by removing a portion of the first surface of the wafer or by etching a portion of the spacer member. It was further said to be unclear what layers constitute the spacer member. Claim 3 has been amended to recite that a portion of the second layer is etched to form the recess. Claims 2 and 3 recognize that a wafer need not comprise a single material, and in fact further limit the claimed wafer to including a first and second layer.

Regarding claim 11, it was said to be unclear if the first layer is attached to the first surface of the wafer or the spacer member or both. It was also said to be unclear if “proximal the recess” and “periphery of the recess” are intended to be the same location. Claim 11 has been amended to recite attaching a first layer onto the first surface of the wafer at a position at least aligned with the recess. Claim 11 thus does not limit the first layer to only covering the first surface at the recess, but rather permits (though does not require) the first layer to extend over the spacer member as well.

Regarding claim 20, it is said to be unclear if the spacer member is formed by deposition into the first surface, or by forming a recess into the first surface, or both. Claim 20 has been amended to recite that the wafer includes a spacer material whose outer surface defines the first surface of the wafer. Claim 20 further recites that the recess is formed by etching into the spacer material. Independent claim 1 recites that forming a recess into the first surface produces the spacer member.

Regarding claim 21, it is said to be unclear if the recess is formed by etching the first surface or the spacer member. The subject matter of claim 21 has been incorporated into claim 20, which recites that the spacer material provides the first surface of the wafer. Claim 21 has thus been cancelled.

Regarding claim 22, it is said to be unclear how the first layer is deposited onto the wafer proximal the recess since the spacer member covers the first surface of the wafer. Claim 22 has been amended to recite the step of, before step (c), depositing a first layer onto the wafer at the recess.

Regarding claims 24-26, it is said to be unclear if the etching steps recited are intended to be a part of the removing step (d) or if the recited etching steps are additional steps. It is also said to be unclear if claims 24-26 define the same etching step or separate steps. Claims 24-26 all clearly recite “wherein step (d) comprises” ... The claims are thus part of step (d). Furthermore, claims 24-26 can be interpreted as the same etching step, or can be interpreted as separate steps. The claims are not intended to be limited to one or the other. A claim is not indefinite for being broad.

Regarding claim 28, it is said to be unclear if the recited step occurs before or after the movable MEMS element is separated from the stationary element. Claim 28 has been amended to recite “wherein step (d) further comprises” thereby clarifying the timing of the recited step.

Regarding claim 29, it is said to be unclear if the steps of producing the movable MEMS element and releasing the movable MEMS element are intended to occur in the same step. Applicant does not intend for the step recited in claim 29 to be limited to occurring at in the same step or in different steps than the “releasing” step recited in claim 1. In particular, the element can be (but does not have to be) produced before it is released, depending on the etching steps used. It is further said to be unclear how a MEMS element with at least two electrically isolated conductive elements is formed since no conductive or insulating elements are recited in claim 1. Claim 29 has been amended to recite that the movable MEMS element has at least two conductive elements supported by an insulator.

Applicant therefore asserts that all claim rejections under 35 U.S.C. 112 have been overcome. Withdrawal of the rejections is respectfully requested.

III. Claim Rejections under 35 U.S.C. §102

Claim 57 is rejected under 35 U.S.C. 102(b) as being anticipated by the Itoigawa patent. Applicant has reviewed Itoigawa, and can not identify every step recited in pending claim 57 as being taught or suggested by Itoigawa.

The Office Action asserts that Itoigawa teaches all steps in Claim 57, as shown by Itoigawa’s Fig. 9F. However, Fig. 9F does not teach or suggest step (e) of claim 57. In particular, step (e) recites removing a portion of the wafer to expose the void and release the movable MEMS element. In Itoigawa Fig. 9F, the void formed between layers 22, 24b, and 25 is not exposed by the etching steps. Itoigawa would have to teach or suggest etching through at least a portion of layer 27 (and possibly layer 26 depending on which portion of layer 27 is being etched) to expose the void. While Applicant agrees with the Office Action in that the claim term wafer is not to be limited to a single layer, but rather is intended to encompass multi-layer wafers as well, Itoigawa’s wafer is not patterned in the manner described in claim 57. Itoigawa also therefore fails to teach releasing a movable MEMS element as recited in step (e) of pending claim 57.

Applicant asserts that claim 57 is allowable over the cited prior art, and withdrawal of the rejection is respectfully requested.

IV. Claim Rejections under 35 U.S.C. §103

Claims 1 and 28-34 are rejected under 35 USC 103 as being unpatentable over Christenson.

Independent claim 1 recites a method for fabricating a MEMS device on a substrate having a movable MEMS element portion free from the substrate and disposed adjacent a stationary MEMS element that is in mechanical communication with the substrate. The method includes providing a wafer having opposed first and second surfaces. A recess is formed into the first surface to produce a spacer member disposed outwardly from the recess (note that claim 1 has been broadened in this respect, and no longer limits the spacer to being disposed at the periphery of the recess). The spacer member is mechanically connected to the substrate to form a composite structure having a void disposed therein. Finally, a portion of the wafer is removed to expose the void and release the movable MEMS element from the stationary MEMS element. It should thus be appreciated that step the recess of step (b) is formed in the same wafer having a portion removed in step (d) to expose the void and release the movable MEMS element.

Christenson fails to teach or suggest all elements recited in claim 1. In particular, Fig. 4B of Christenson illustrates forming a recess 52 in a surface of a first substrate 50 to form spacer members disposed outwardly from the recess. The spacers are then attached to a second patterned substrate 58 (See Figs. 4C-4J). However, as illustrated in Figs. 4K-4M, a portion 66 of the *second*, and not the first, substrate is removed to expose the void and release the movable MEMS element. Accordingly, Christenson's recess 52 is not formed in the same wafer having the portion removed, as recited in step (d) of claim 1. Furthermore, Applicant has not identified any teaching within Christenson that suggests creating the recess in the second, rather than the first, substrate. In fact, Christenson teaches away from creating the recess in the second substrate, as recess 52 is deeper than the entire thickness of substrate 58 as illustrated in Figs. 4H-4M.

Applicant therefore asserts that claim 1 is patentable over the cited prior art, and that the patentability of independent claim 1 provides sufficient basis for the patentability of corresponding dependent claims 28-34. Accordingly, withdrawal of the rejection of claims 1 and 28-34 is respectfully requested.

V. Allowable Subject Matter

Applicant notes with appreciation that claims 2-27 and 45 are not rejected over the prior art, and that claims 35-44 and 46-56 are allowed. Applicant has addressed each objection and rejection of claims 2-27 and 45. Claim 45 has further been amended for the

purposes of form and clarity only. Applicant therefore respectfully requests formal allowance of claims 2-27, and 35-56.

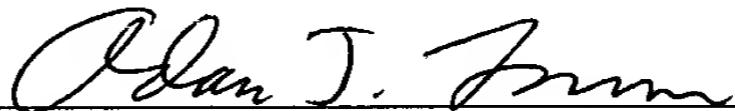
VI. Conclusion

Applicant therefore respectfully asserts that all rejections and objections cited by the Examiner have been overcome. Accordingly, the application is in condition for allowance, and a Notice of Allowance is earnestly solicited.

No fee is believed to be due with the filing of this communication. However, if a fee is deemed due, Applicant hereby authorizes the Commissioner to charge such fees, arising from this or any other communication, to deposit account No. 17-0055. The Examiner is invited to contact the undersigned at the telephone number appearing below if such would advance the prosecution of this application.

Respectfully submitted,

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